

## EVIDENCE OF ONTOGENETIC SETAL CHANGES IN *HETEROMASTUS FILIFORMIS* (POLYCHAETA: CAPITELLIDAE)

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*Abstract.*—*Heteromastus filiformis* undergoes ontogenetic setal replacement in the fourth and fifth setiger. Setigers 4 and 5 initially bear hooded hooks which are gradually lost and replaced by capillary setae.

The possible occurrence of ontogenetic setal changes in the polychaete *Heteromastus filiformis* was first observed in samples taken during a colonization experiment in the lower York River, Virginia (Fredette 1980). The first sample set (0.25 mm sieve), taken shortly after deployment of azoic substrates, contained newly set juveniles of several different species of benthos, including a capitellid polychaete. The general body morphology of these newly set capitellids was similar to that of the 2 locally common species, *Heteromastus filiformis* and *Mediomastus ambiseta*. However, the specific characters fit neither. The juveniles had capillary setae on the first 3 setigers while the remaining setigers bore hooded hooks. This is quite unlike *H. filiformis* which has the first 5 anterior setigers with capillary setae and *M. ambiseta* which has capillary setae in the first 4 anterior setigers and the last several notopodia. Specific taxonomic placement of these juvenile capitellids did not seem possible.

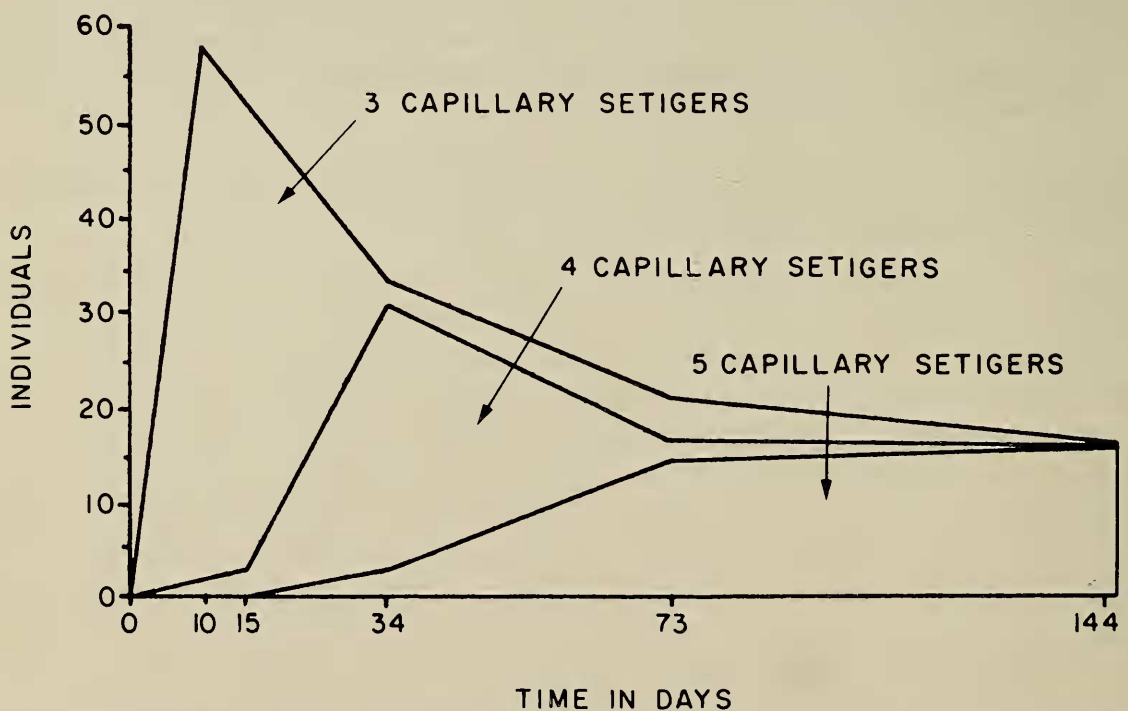


Fig. 1. Progression of setal changes observed in a population of *H. filiformis* colonizing azoic substrates in the York River, Virginia. Volume of area indicates percent of population exhibiting the indicated character.

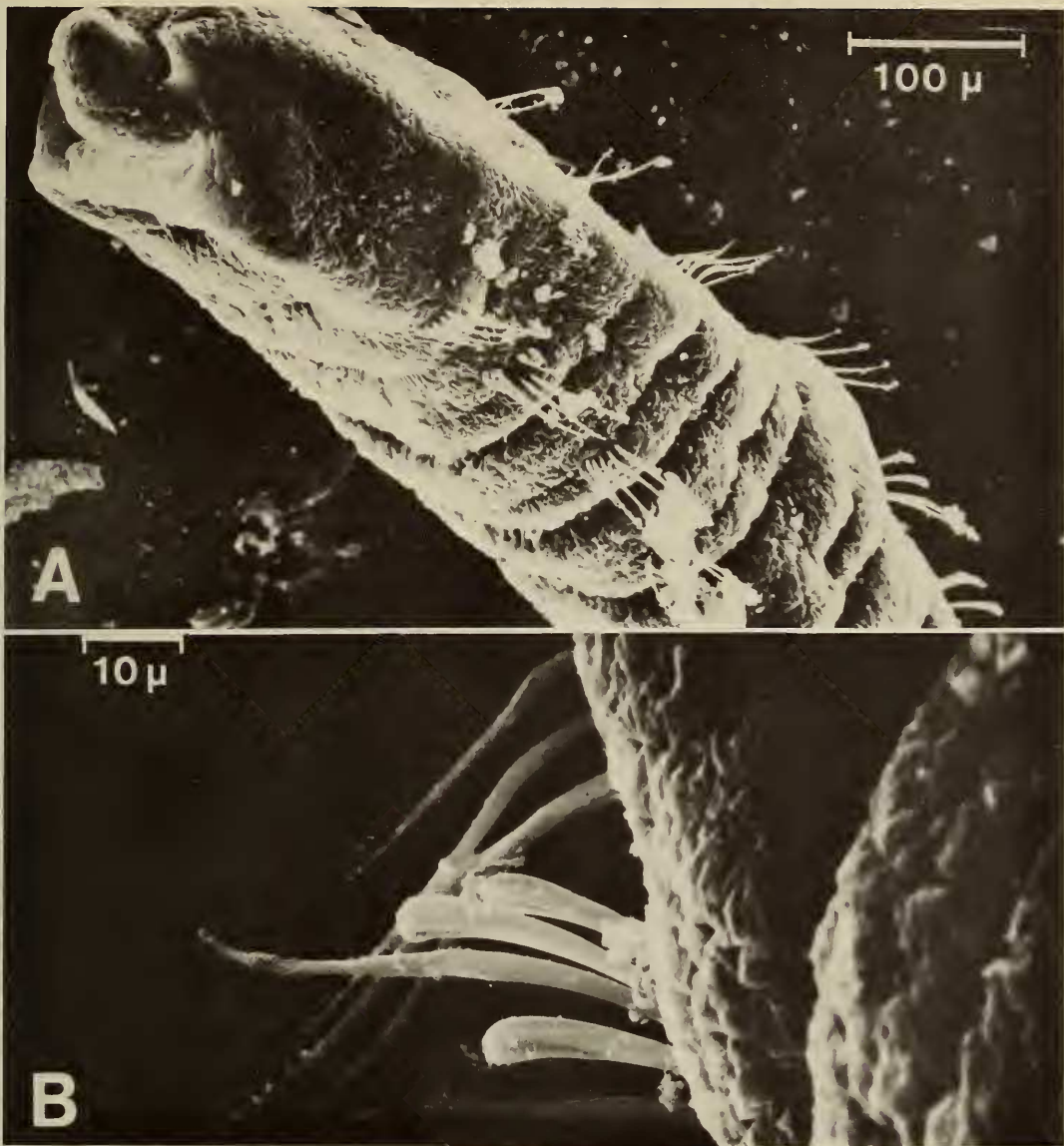


Fig. 2. SEM micrographs of juvenile capitellids: A, Anterior end of a juvenile capitellid with both capillary and hooded hook setae on fifth setiger; B, Mixed setal bundle of a juvenile capitellid. Setal bundle in background bears all capillary setae.

Successive samplings taken during the colonization process revealed serial changes in setal pattern in the population of newly set capitellids (Fig. 1). The individuals from these later samples constituted a continuum from the 3-capillary setiger stage to a 5-setiger stage. The continuum was complete with intermediate stages (individuals with setal bundles containing both capillary setae and hooded hooks) (Fig. 2) and a gradation of sizes. The graph shown in Figure 1 is based on the assumption that all the juveniles are *H. filiformis*. However, individuals that were obviously *M. ambiseta* also occurred in the samples from day 73 and day 144. The large time gaps in the sampling series made a final conclusion on the specific placement of these juveniles difficult.

Additional documentation of this phenomenon was obtained by examining samples from an ongoing benthic study in the lower York River in which weekly samples are being taken (Diaz, unpublished data). It was felt that these samples would clarify the progression of setal changes and help to better isolate the ap-

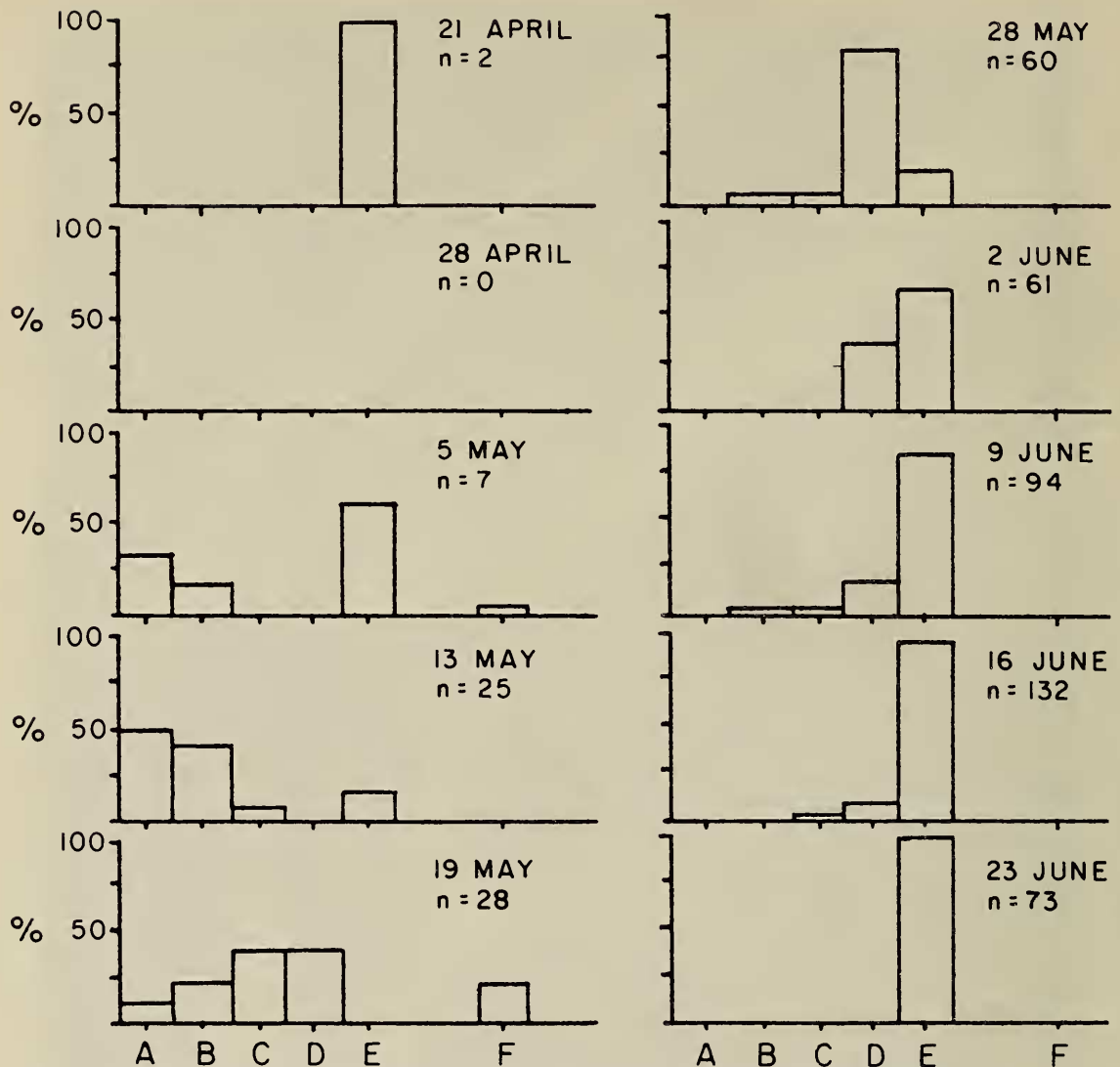


Fig. 3. Weekly distribution of setal pattern in a field population of capitellids. A, 3 anterior capillary setigers; B, 4th setiger with both capillary and hooded hook setae; C, 4 anterior capillary setigers (no posterior capillaries); D, 5th setiger with both capillary and hooded hook setae; E, 5 anterior capillary setigers (*H. filiformis* pattern); F, 4 anterior capillary setigers, posterior capillaries (*M. ambiseta* pattern). Areas indicated are percents of total population.

pearance of *M. ambiseta* and *H. filiformis* in the benthic community. Individuals in these samples were placed into 6 classes: (A) 3 anterior capillary setigers, (B) fourth setiger with mixed capillaries and hooded hooks (no posterior capillaries), (C) 4 anterior capillary setigers (no posterior capillaries), (D) fifth setiger with mixed capillaries and hooded hooks, (E) *H. filiformis* setal pattern, (F) *M. ambiseta* setal pattern.

The occurrence of *M. ambiseta* in these samples was sporadic, in low densities and seemed to bear no relationship to the development of the juvenile capitellids (Fig. 3). Also, a few small individuals of *M. ambiseta* were found that were similar in size to the other juvenile capitellids, indicating that *M. ambiseta* may have the same setal pattern in juveniles and adults.

The other five classes appear in a pattern similar to the age-class distributions one expects from a population with synchronous breeding and recruitment (Fig. 3). Recruitment occurs in early May and the population quickly passes through the various setal changes until 7 weeks later when all the individuals exhibit the typical *H. filiformis* pattern.



Table 1.—Width measurement ( $\mu\text{m}$ ) of fifth setiger, means or ranges.

Class	Width
3 capillary setigers	146.2, n = 4
4th mixed	185.6, n = 9
4 capillary setigers	208.7, n = 7
5th mixed	317.2, n = 16
<i>H. filiformis</i> (adults)	300–600
juvenile <i>M. ambiseta</i>	140–200

To illustrate the progression of sizes that occur, several individuals from each class were measured by recording the width of the fifth setiger. The juvenile *M. ambiseta* were also measured for comparison (Table 1). As indicated earlier these individuals are similar in size to the 3-capillary setiger individuals. The juvenile capitellids showed a steady progression of sizes and change to a 5-capillary setal pattern.

That *H. filiformis* undergoes an ontogenetic development from a 3 anterior capillary stage to a 5 anterior capillary stage is strongly indicated by the evidence presented. Setigers 4 and 5 initially bear hooded hooks which are gradually lost and replaced by capillary setae. *Mediomastus ambiseta* appears not to undergo such a morphological change. Further substantiation of the observed setal changes could be facilitated by examination of cultured populations of these two capitellid species.

The separation of *M. ambiseta* and *H. filiformis* in benthic samples (0.5 mm sieve) by anterior capillary setiger counts alone (see keys of Ewing and Dauer 1981, Fauchald 1977) is not sufficient. Examination for posterior notopodial capillaries is necessary.

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